



FPM-7620E Processing Module Guide



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FPM-7620E Processing Module Guide

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FPM-7620E processing module

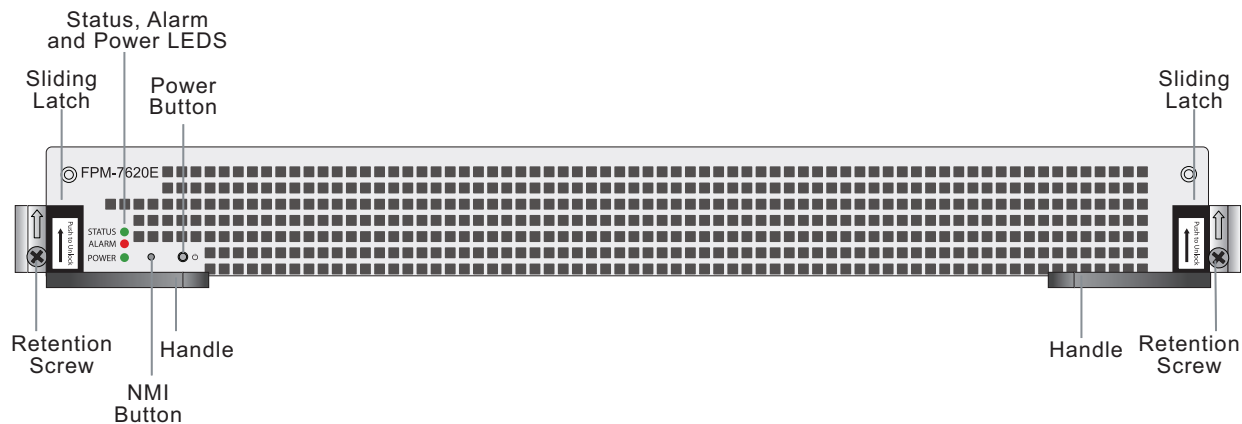
The FPM-7620E processing module is a high-performance worker module that processes sessions load balanced to it by FortiGate-7000 series interface (FIM) modules over the chassis fabric backplane. The FPM-7620E can be installed in any FortiGate-7000 series chassis in slots 3 and up.

The FPM-7620E includes two 80Gbps connections to the chassis fabric backplane and two 1Gbps connections to the base backplane. The FPM-7620E processes sessions using a dual CPU configuration, accelerates network traffic processing with 4 NP6 processors and accelerates content processing with 8 CP9 processors. The NP6 network processors are connected by the FIM switch fabric so all supported traffic types can be fast path accelerated by the NP6 processors.

The FPM-7620E includes the following hardware features:

- Two 80Gbps fabric backplane channels for load balanced sessions from the FIM modules installed in the chassis.
- Two 1Gbps base backplane channels for management, heartbeat and session sync communication.
- Dual CPUs for high performance operation.
- Four NP6 processors to offload network processing from the CPUs.
- Eight CP9 processors to offload content processing and SSL and IPsec encryption from the CPUs.

FPM-7620E front panel



- Power button.
- NMI switch (for troubleshooting as recommended by Fortinet Support).
- Mounting hardware.
- LED status indicators.

Physical Description

Dimensions	1.2 x 11.34 x 14 in. (3.1 x 28.8 x 35.1 cm) (Height x Width x Depth)
Weight	7.2 lb. (3.23 kg)
Operating Temperature	32 to 104°F (0 to 40°C)
Storage Temperature	-31 to 158°F (-35 to 70°C)
Relative Humidity	10% to 90% non-condensing

Front Panel LEDs

LED	State	Description
STATUS	Off	The FPM-7620E is powered off.
	Green	The FPM-7620E is powered on and operating normally.
	Flashing Green	The FPM-7620E is starting up.
ALARM	Red	Major alarm.
	Amber	Minor alarm
	Off	No alarms
POWER	Green	The FPM-7620E is powered on and operating normally.
	Off	The FPM-7620E is powered off.

Turning the module on and off

You can use the front panel power button to turn the module power on or off. If the module is powered on, press the power switch to turn it off. If the module is turned off and installed in a chassis slot, press the power button to turn it on.

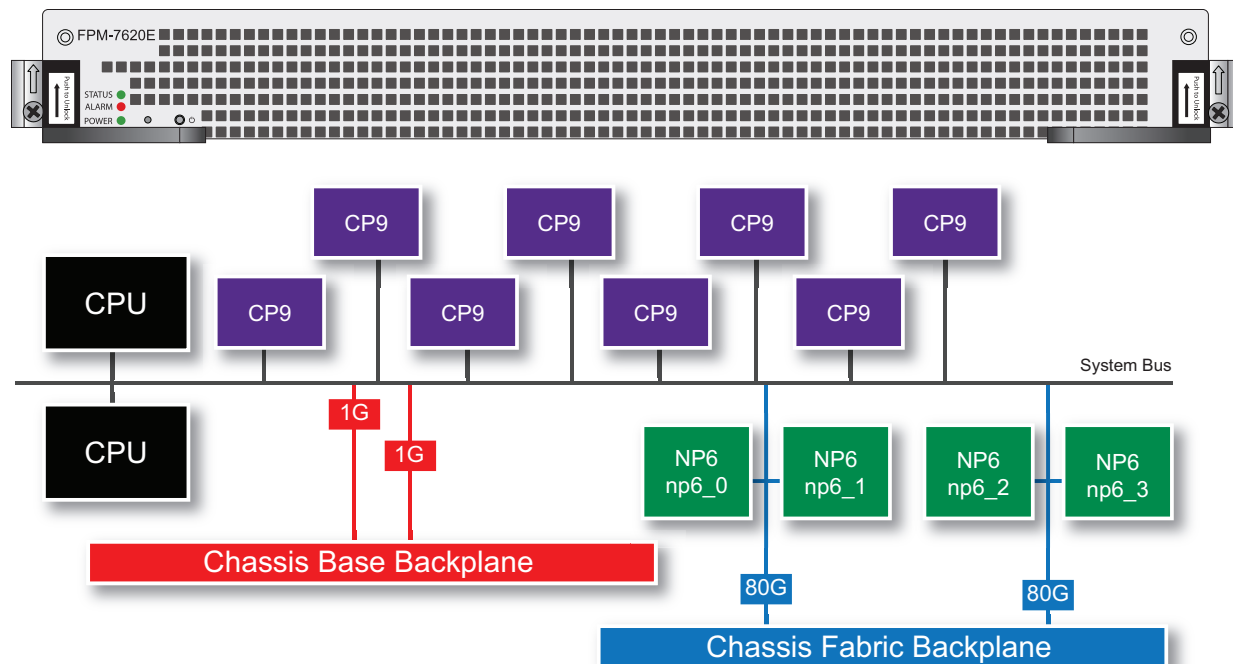
NMI switch

When working with Fortinet Support to troubleshoot problems with the FPM-7620E you can use the front panel non-maskable interrupt (NMI) switch to assist with troubleshooting. Pressing this switch causes the software to dump registers/backtraces to the console. After the data is dumped the board reboots. While the board is rebooting, traffic is temporarily blocked. The board should restart normally and traffic can resume once its up and running.

NP6 network processors - offloading load balancing and network traffic

The four FPM-7620E NP6 network processors combined with the FIM module integrated switch fabric (ISF) provide hardware acceleration by offloading load balancing from the FPM-7620E CPUs. The result is enhanced network performance provided by the NP6 processors plus the network processing load is removed from the CPU. The NP6 processor can also handle some CPU intensive tasks, like IPsec VPN encryption/decryption. Because of the integrated switch fabric, all sessions are fast-pathed and accelerated.

FPM-7620E hardware architecture



Accelerated IPS, SSL VPN, and IPsec VPN (CP9 content processors)

The FPM-7620E includes eight CP9 processors that provide the following performance enhancements:

- Flow-based inspection (IPS, application control etc.) pattern matching acceleration with over 10Gbps throughput
 - IPS pre-scan
 - IPS signature correlation
 - Full match processors
- High performance VPN bulk data engine
 - IPsec and SSL/TLS protocol processor
 - DES/3DES/AES128/192/256 in accordance with FIPS46-3/FIPS81/FIPS197
 - MD5/SHA-1/SHA256/384/512-96/128/192/256 with RFC1321 and FIPS180
 - HMAC in accordance with RFC2104/2403/2404 and FIPS198
 - ESN mode
 - GCM support for NSA "Suite B" (RFC6379/RFC6460) including GCM-128/256; GMAC-128/256
- Key Exchange Processor that supports high performance IKE and RSA computation
 - Public key exponentiation engine with hardware CRT support
 - Primary checking for RSA key generation
 - Handshake accelerator with automatic key material generation
 - True Random Number generator
 - Elliptic Curve support for NSA "Suite B"
 - Sub public key engine (PKCE) to support up to 4096 bit operation directly (4k for DH and 8k for RSA with CRT)
- DLP fingerprint support
 - TTTD (Two-Thresholds-Two-Divisors) content chunking
 - Two thresholds and two divisors are configurable

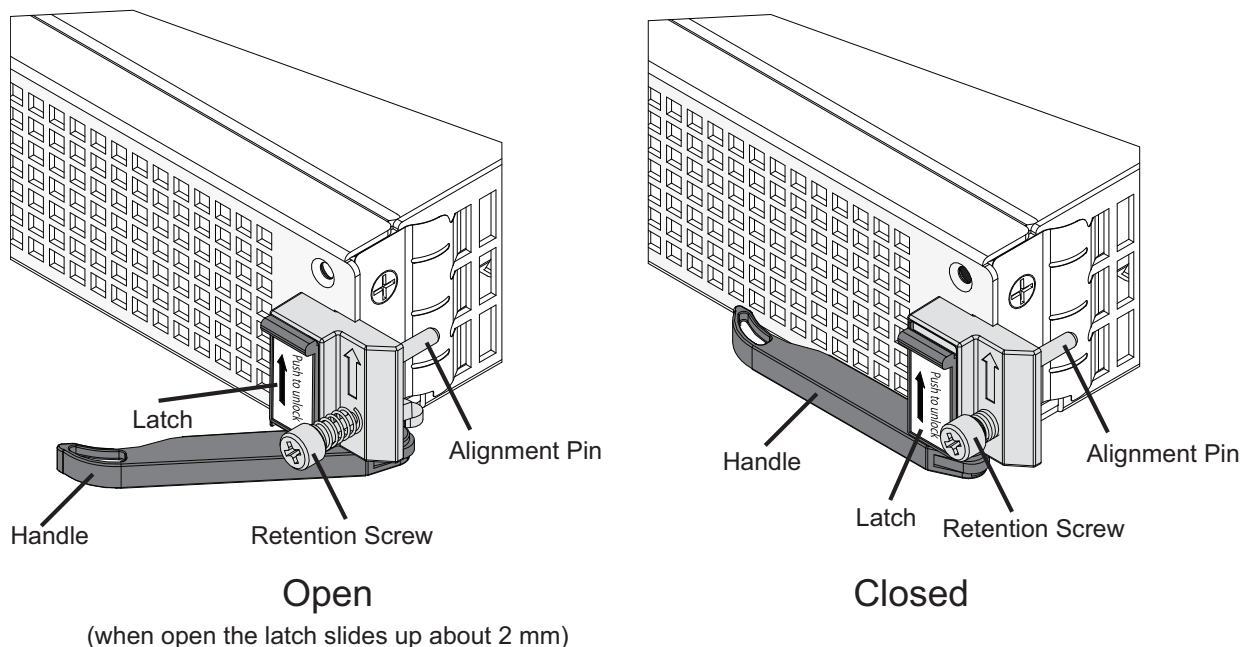
Hardware installation

This chapter describes installing a FPM-7620E processing module into a FortiGate-7000 chassis.

FPM-7620E mounting components

To install a FPM-7620E you slide the module into slot 3 or up in the front of an FortiGate-7000 series chassis and then use the mounting components to lock the module into place in the slot. When locked into place and positioned correctly the module front panel is flush with the chassis front panel. The module is also connected to the chassis backplane.

To position the module correctly you must use the mounting components shown below for the right of the FPM-7620E front panel. The mounting components on the left of the front panel are the same but reversed. The FPM-7620E mounting components align the module in the chassis slot and are used to insert and eject the module from the slot.



The FPM-7620E handles align the module in the chassis slot and are used to insert and eject the module from the slot. The latches activate micro switches that turn on or turn off power to the module. When both latches are raised the module cannot receive power. When the latches are fully closed if the module is fully inserted into a chassis slot the module can receive power.

Inserting a FPM-7620E module into a chassis

This section describes how to install a FPM-7620E module into a FortiGate-7000 series chassis slot 3 or up.



You must carefully slide the module all the way into the chassis slot, close the handles to seat the module into the slot, and tighten the retention screws to make sure the module is fully engaged with the backplane and secured. You must also make sure that the sliding latches are fully closed by gently pushing them down. The handles must be closed, the retention screws tightened and the latches fully closed for the module to get power and start up. If the module is not receiving power all LEDs remain off.

FPM-7620Es are hot swappable. The procedure for inserting a FPM-7620E into a chassis slot is the same whether or not the chassis is powered on.

To insert a FPM-7620E into a chassis slot



Do not carry the FPM-7620E by holding the handles or retention screws. When inserting or removing the FPM-7620E from a chassis slot, handle the module by the front panel. The handles are not designed for carrying the board. If the handles become bent or damaged the FPM-7620E may not align correctly in the chassis slot.

To complete this procedure, you need:

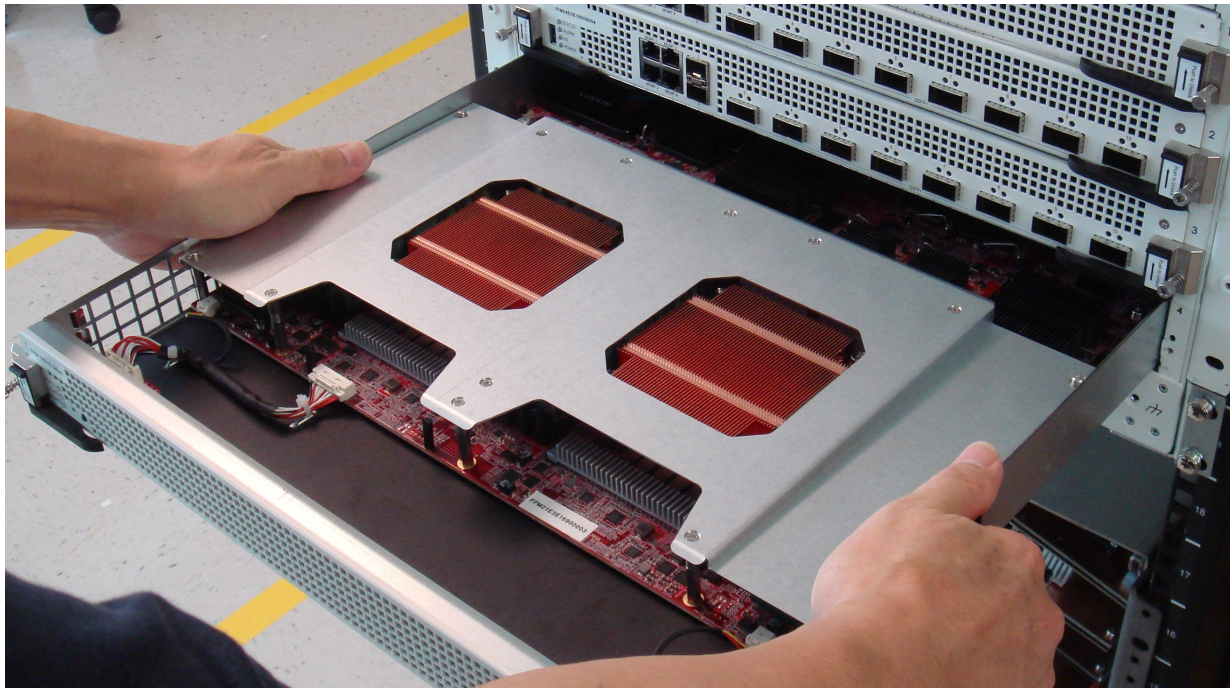
- A FPM-7620E
- A FortiGate-7000 chassis with an empty hub/switch slot
- An electrostatic discharge (ESD) preventive wrist strap with connection cord



FPM-7620Es must be protected from static discharge and physical shock. Only handle or work with FPM-7620Es at a static-free workstation. Always wear a grounded electrostatic discharge (ESD) preventive wrist strap when handling FPM-7620Es. Attach the ESD wrist strap to your wrist and to an ESD socket or to a bare metal surface on the chassis or frame. (An ESD wrist strap is not visible in the photographs below because they were taken in an ESD safe lab environment.)

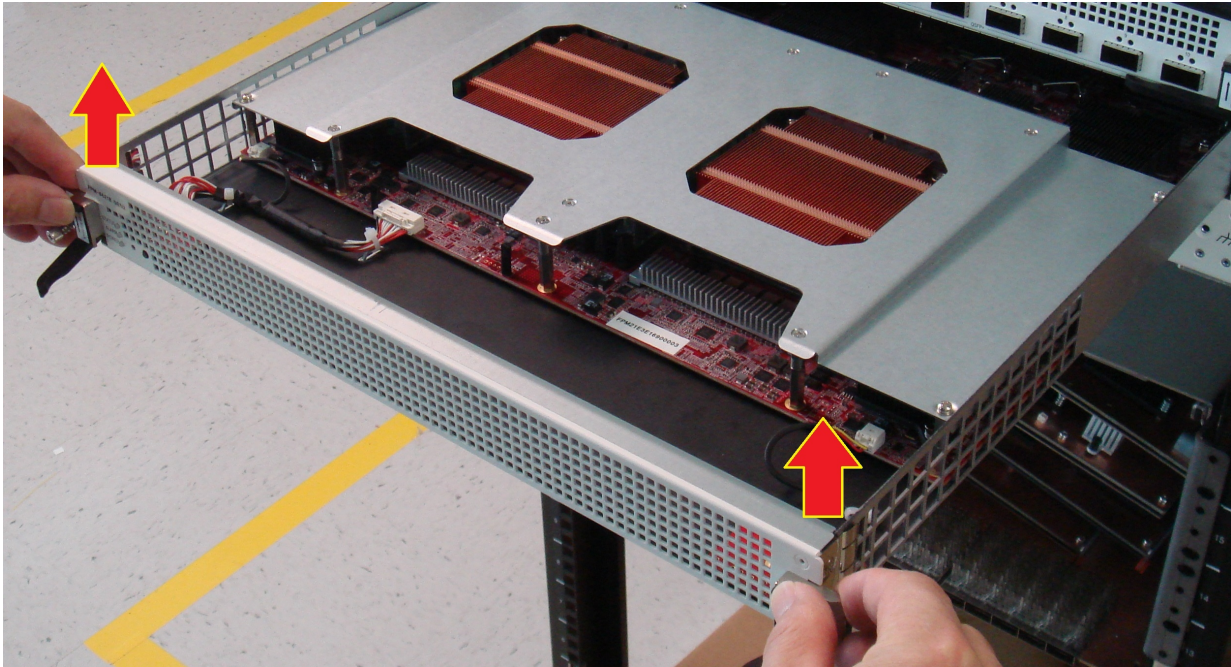
1. Remove the FPM-7620E module from its packaging. Align the module with the chassis slot and slide the module part way into the slot.

In the photograph the FPM-7620E is being installed into chassis slot 4 of a FortiGate-7040E chassis.



2. Unlock the left and right handles by pushing the handle latches up about 2 mm until the handles pop open.

Fully open both handles before sliding the module into the chassis to avoid damaging the handle mechanism. Damaging the handles may prevent the module from connecting to power.



3. Carefully slide the module into the slot until the handles engage with the sides of the chassis slot, partially closing the them.

Insert the module by applying moderate force to the front faceplate (not the handles) to slide the module into the slot. The module should glide smoothly into the chassis slot. If you encounter any resistance while sliding the module in, the module could be aligned incorrectly. Pull the module back out and try inserting it again.



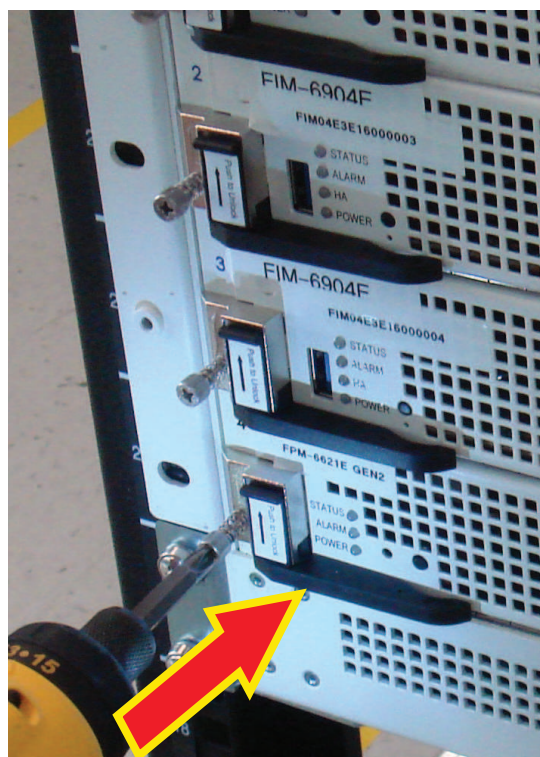
4. Push both handles closed and close the latches.

Closing the handles draws the module into place in the chassis slot and into full contact with the chassis backplane. The module front panel should be in contact with the chassis front panel and the latches should drop down and lock into place. You should gently push the latches down to make sure they lock. The module will not receive power until the latches are fully locked.



5. Tighten both retention screws to secure the module in the chassis.

You can tighten the retention screws by hand with a Phillips screwdriver. If you use a power screwdriver the tightening torque needs to be adjusted between 3 In-lb to 4 In-lb (0.4 N-m to 0.48 N-m).



As the latches are locked, power is supplied to the module. If the chassis is powered on during insertion the status LED flashes green as the module starts up. Once the board has started up and is operating correctly, the front panel LEDs are lit for normal operation.

Normal LED operation

LED	State
Status	Green
Alarm	Off
Power	Green

Shutting down and removing a FPM-7620E board from a chassis

To avoid potential hardware problems, always shut down the FPM-7620E operating system properly before removing the FPM-7620E from a chassis slot or before powering down the chassis.

Disconnect all cables from the FPM-7620E module, including all network cables and USB cables or keys.

FPM-7620Es are hot swappable. The procedure for removing a FPM-7620E from a chassis slot is the same whether or not the chassis is powered on.

To remove a FPM-7620E board from a chassis slot



Do not carry the FPM-7620E by holding the handles or retention screws. When inserting or removing the FPM-7620E from a chassis slot, handle the module by the front panel. The handles are not designed for carrying the board. If the handles become bent or damaged the FPM-7620E may not align correctly in the chassis slot.

To complete this procedure, you need:

- A FortiGate-7000 chassis with a FPM-7620E module installed
- An electrostatic discharge (ESD) preventive wrist strap with connection cord



FPM-7620Es must be protected from static discharge and physical shock. Only handle or work with FPM-7620Es at a static-free workstation. Always wear a grounded electrostatic discharge (ESD) preventive wrist strap when handling FPM-7620Es. (An ESD wrist strap is not visible in the photographs below because they were taken in an ESD safe lab environment.)

1. Fully loosen the retention screws.

You must fully loosen the screws or the handles may be damaged when used to eject the board from the chassis slot.



2. Unlock the left and right handles by pushing the latches up about 2 mm until the handles pop open.

Pushing the latches up turns off the module's power.

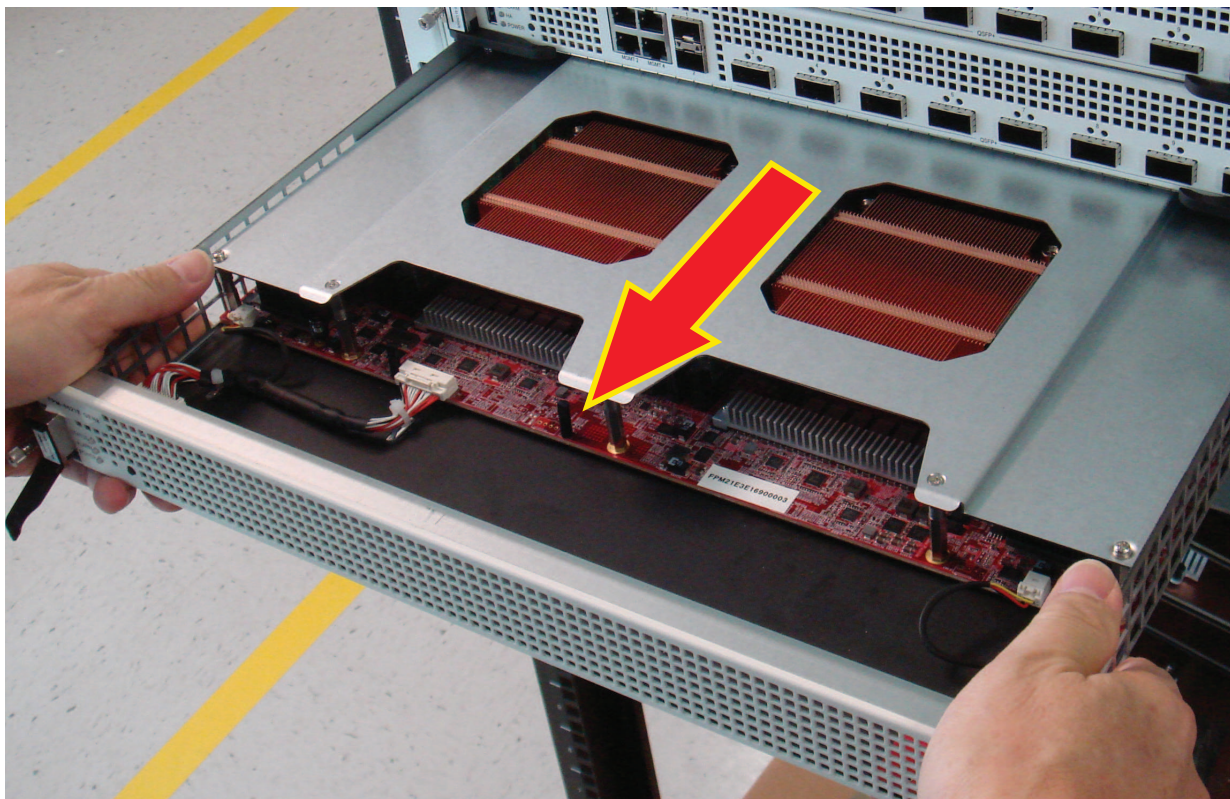


3. Fully open the handles to eject the module from the chassis.

You need to open the handles with moderate force to eject the module from the chassis.



4. Hold the module front panel sides and slide it part way out of the slot. Then grasp the module by the sides and carefully slide it out of the slot.



Troubleshooting

This section describes some common troubleshooting topics:

FPM-7620E does not startup

Positioning of FPM-7620E handles and a few other causes may prevent a FPM-7620E from starting up correctly.

Latches and handles not fully closed

If the latches or handles are damaged or positioned incorrectly the FPM-7620E may not start up. Make sure the latches are fully closed and the handles are correctly aligned, fully inserted and locked and the retention screws are tightened.

Firmware problem

If the FPM-7620E is receiving power and the latches and handles are fully closed, and you have restarted the chassis and the FPM-7620E still does not start up, the problem could be with FortiOS. Connect to the FPM-7620E console and try cycling the power to the board. If the BIOS starts up, interrupt the BIOS startup and install a new firmware image.

If this does not solve the problem, contact Fortinet Technical Support.

FPM-7620E status LED is flashing during system operation

Normally, the FPM-7620E Status LED is off when the FPM-7620E is operating normally. If this LED starts flashing while the module is operating, a fault condition may exist. At the same time the FPM-7620E may stop processing traffic.

To resolve the problem you can try removing and reinserting the FPM-7620E in the chassis slot. Reloading the firmware may also help.

If this does not solve the problem there may have been a hardware failure or other problem. Contact Fortinet Technical Support for assistance.

Cautions and Warnings

Environmental Specifications

Rack Mount Instructions - The following or similar rack-mount instructions are included with the installation instructions:

Instructions de montage en rack - Les instructions de montage en rack suivantes ou similaires sont incluses avec les instructions d'installation:

Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.

Température ambiante élevée – S'il est installé dans un rack fermé ou à unités multiples, la température ambiante de fonctionnement de l'environnement du rack peut être supérieure à la température ambiante de la pièce. Par conséquent, il est important d'installer le matériel dans un environnement respectant la température ambiante maximale (Tma) stipulée par le fabricant.

Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

Ventilation réduite – Installation de l'équipement dans un rack doit être telle que la quantité de flux d'air nécessaire au bon fonctionnement de l'équipement n'est pas compromise.

Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

Chargement Mécanique – Montage de l'équipement dans le rack doit être telle qu'une situation dangereuse n'est pas liée à un chargement mécanique inégal.

Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

Surtension – Il convient de prendre l'ensemble des précautions nécessaires lors du branchement de l'équipement au circuit d'alimentation et être particulièrement attentif aux effets de la suralimentation sur le dispositif assurant une protection contre les courts-circuits et le câblage. Ainsi, il est recommandé de tenir compte du numéro d'identification de l'équipement.

Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

Fiabilité de la mise à la terre – Fiabilité de la mise à la terre de l'équipement monté en rack doit être maintenue. Une attention particulière devrait être accordée aux connexions d'alimentation autres que les connexions directes au circuit de dérivation (par exemple de l'utilisation de bandes de puissance).

Blade Carriers, Cards and Modems must be Listed Accessories or Switch, Processor, Carrier and similar blades or cards should be UL Listed or Equivalent.

Serveur-blades, cartes et modems doivent être des accessoires listés ou commutateurs, processeurs, serveurs et similaire blades ou cartes doivent être listé UL ou équivalent.

Refer to specific Product Model Data Sheet for Environmental Specifications (Operating Temperature, Storage Temperature, Humidity, and Altitude).

Référez à la Fiche Technique de ce produit pour les caractéristiques environnementales (Température de fonctionnement, température de stockage, humidité et l'altitude).

Safety

Moving parts — Hazardous moving parts. Keep away from moving fan blades.

Pièces mobiles – Pièces mobiles dangereuses. Se tenir éloigné des lames mobiles du ventilateur.

Warning: Equipment intended for installation in Restricted Access Location.

Avertissement: Le matériel est conçu pour être installé dans un endroit où l'accès est restreint.

Warning: A readily accessible disconnect device shall be incorporated in the building installation wiring.

Avertissement: Un dispositif de déconnexion facilement accessible doit être incorporé dans l'installation électrique du bâtiment.

Battery – Risk of explosion if the battery is replaced by an incorrect type. Do not dispose of batteries in a fire. They may explode. Dispose of used batteries according to your local regulations. **IMPORTANT:** Switzerland: Annex 4.10 of SR814.013 applies to batteries.

Batterie – Risque d'explosion si la batterie est remplacée par un type incorrect. Ne jetez pas les batteries au feu. Ils peuvent exploser. Jetez les piles usagées conformément aux réglementations locales. **IMPORTANT:** Suisse: l'annexe 4.10 de SR814.013 s'appliquent aux batteries.

警告

本電池如果更換不正確會有爆炸的危險

請依製造商說明書處理用過之電池

Caution: Disconnect power supply cords before servicing

Attention: Débranchez les cordons de la source d'alimentation avant tout entretien.

Grounding — To prevent damage to your equipment, connections that enter from outside the building should pass through a lightning / surge protector, and be properly grounded. Use an electrostatic discharge workstation (ESD) and/or wear an anti-static wrist strap while you work. In addition to the grounding terminal of the plug, on the back panel, there is another, separate terminal for earthing.

Mise à la terre — Pour éviter d'endommager votre matériel, assurez-vous que les branchements qui entrent à partir de l'extérieur du bâtiment passent par un parafoudre / parasurtenseur et sont correctement mis à la terre. Utilisez un poste de travail de décharge électrostatique (ESD) et / ou portez un bracelet anti-statique lorsque vous travaillez. Ce produit possède une borne de mise à la terre qui est prévu à l'arrière du produit, à ceci s'ajoute la mise à la terre de la prise.

This product has a separate protective earthing terminal provided on the back of the product in addition to the grounding terminal of the attachment plug. This separate protective earthing terminal must be permanently connected to earth with a green with yellow stripe conductor minimum size # 6 AWG and the connection is to be installed by a qualified service personnel.

Ce produit a une borne de mise à la terre séparé sur le dos de l'appareil, en plus de la borne de mise à la terre de la fiche de raccordement. Cette borne de mise à la terre séparée doit être connecté en permanence à la terre avec un conducteur vert avec la taille bande jaune de minimum # 6 AWG et la connexion doit être installé par un personnel qualifié.

Caution: Slide/rail mounted equipment is not to be used as a shelf or a work space.

Attention: Un équipement monté sur bâti ne doit pas être utilisé sur une étagère ou dans un espace de travail.

Regulatory Notices

Federal Communication Commission (FCC) – USA

This device complies with Part 15 of FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received; including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

WARNING: Any changes or modifications to this product not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Industry Canada Equipment Standard for Digital Equipment (ICES) – Canada

CAN ICES-3 (A) / NMB-3 (A)

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

European Conformity (CE) - EU

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.



Voluntary Control Council for Interference (VCCI) – Japan

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。VCCI-A

Product Safety Electrical Appliance & Material (PSE) – Japan

日本では電気用品安全法(PSE)の規定により、同梱している電源コードは本製品の専用電源コードとして利用し、他の製品に使用しないでください。

Bureau of Standards Metrology and Inspection (BSMI) – Taiwan

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

China

此为A级产品，在生活环境中，该产品可能会造成无线电干扰。这种情况下，可能需要用户对其采取切实可行的措施。



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High Performance Network Security



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